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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|---------------------------|
| 10/661,662 | 09/15/2003 | Nobuhiko Izuta | 242866US0 | 9353 |
| 22850 | 7590 | 08/29/2006 | | |
| C. IRVIN MCCLELLAND OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314 | | | | EXAMINER AHMED, SHAMIM |
| | | | | ART UNIT 1765 |
| | | | | PAPER NUMBER |

DATE MAILED: 08/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|--|----------------------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/661,662 Examiner Shamim Ahmed | IZUTA ET AL. Art Unit 1765 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 17 July 2006.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-5 and 7-13 is/are pending in the application.
 - 4a) Of the above claim(s) 9 is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-5,10-13 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/17/06 has been entered.

Response to Arguments

2. Applicant's arguments filed 7/17/06 have been fully considered but they are not persuasive. Applicants argue that Yokomizo et al teach that water is added to the etching solution in order to maintain the concentration of the etching liquid to a designated value but fail to teach or suggest that the designated value relates to the value relating the present invention.

In response to the argument, examiner states that the argument is not persuasive because Yokomizo et al teach that the desired temperature such as boiling state of the etching solution is maintained by temperature controller 22 in the circulation system (col.5, lines 39-44 and col.6, lines 43-47).

In response to the statement of the non-elected claim 9, examiner states that the restriction requirement is made final along with the reason statement in the previous office action dated 9/1/05.

3. Claims 1-5,7-8 and 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yokomizo et al (6,399,517) in view of Kaji et al (4,980,017).

Yokomizo et al disclose a process of etching semiconductor wafer having silicon nitride layer on it and the process including the steps of:

- exposing the wafer in an etching bath including phosphoric acid (col.3, lines 34-46);
- circulating the etching bath comprising a circulation pipe line 20A provided with a circulation pump 21, a filter 23 and adding or supplying pure water from a water source 24 (col.4, lines 13-25 and figure 1).

Yokomizo et al also disclose that during the etching process silicon concentration increases in the etching solution as particles, which are removed by the filter 23 in process of passing through the circulation (col.6, lines 6-11).

Yokomizo et al further disclose that pure water is added into the etching bath by diluting the bath with the pure water, which causes a lowering the concentration of the phosphoric acid solution and as well as lowering the temperature of the etching solution (col.6, lines 31-47).

Yokomizo et al teach that a temperature controller (22) is provided after the filtration system (23) in order to maintain designated temperature for the etching solution (col. 6, lines 50-col.7, lines 3).

Yokomizo et al remain silent regarding the concentration drop or lowering the concentration of the phosphoric acid solution is 80-50 wt. % and also cooling down the etching solution to 100 degree to room temperature (claim 4).

However, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to optimize the same as the Yokomizo et al teach that both the concentration and the temperature are maintained within the respective designated ranges for efficiently maintaining the etching process (col.7, lines 1-3).

Yokomizo et al teach the concentration of the phosphoric acid is maintained at a desired fixed value (col.5, lines 39-44 and col.6, lines 43-47) but remain silent regarding the concentration of the phosphoric acid in said etching solution is raised to 80-90 wt%.

However, Kaji et al teach that heating the etching solution at a desired temperature such as a boiling state is maintained in order to constantly maintained the concentration of the etching bath in a predetermined range (col.4, lines 47-50), for example concentration of phosphoric acid is 85% at a boiling state of at a temperature of 158 Degree C and concentration of phosphoric acid is 90% a boiling state at a temperature of 175 Degree C (col.5, lines 26-35) for an improved etching condition (col.2, line 66-col.3, line 2).

Therefore, it would have been obvious to one of ordinary skilled in the art at the time of claimed invention to define the desired or designated etching parameter such as the claimed concentration value into Yokomizo et al's etching process for improved etching process as taught by Kaji et al.

Furthermore, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

As to claim 8, Yokomizo et al discussed above that regeneration and filtration are both performed together but remain silent regarding splitting into two streams.

However, the transposition of process steps or the splitting of one step into two, where the processes are substantially identical or equivalent in terms of function, manner and result, was held to be not patentably distinguishing the processes. *Ex parte Rubin* 128 USPQ 440 (PTO Bdpat App 1959).

As to claim 10, it would have been obvious to one of skilled in the art to optimize the same because Kajii et al teaches above that the concentration is maintained with the respect of the boiling state of the etching solution.

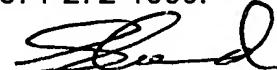
As to claims 11-13, Yokomizo et al illustrates that the etching rate of the oxide layer is raised or maintained in the range of 0-50 ppm in the concentration of the silicon compound in the etching solution (col.9, lines 56-64).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (571) 272-1457. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine G. Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Shamil Ahmed
Primary Examiner
Art Unit 1765

SA
August 23, 2006